

Bosnia and Herzegovina:

Estimation of the Effect of the Agreement of Amendment of an Accession to the CEFTA on Bosnia and Herzegovina¹ Trade Flows and Calculation of Trade Potential

Sandra Hlivnjak*, Amra Mujabašić*, Emina Fočo-Obeji**, Lejla Hamzić**

Abstract

This paper provides an assessment of the trade performance of Western Balkan (WB) countries with the EU countries. The particular focus is on Bosnia and Herzegovina's (BiH) trade potential and an estimation of the effects of the Agreement of Amendment to the Central European Free Trade Agreement (CEFTA 2006) using gravity equations. The approach taken by Bussière et al. (2005) is used as a base reference to develop the model of BiH trade flows and latter on BiH trade potential. Bussière et al. (2005) estimated the potential trade of Central and Eastern European countries using a new measure of trade integration called the "trade condition indicator". This indicator is calculated from country-pair specific effects after controlling for the levels of the time-invariant variables, like distance. Fixed effect vector decomposition (FEVD) procedure offers a solution to the problem of estimating time-invariant variables in panel data when at least one variable is correlated with the unobservable unit effect. FEVD is considered as a proper procedure for this application since CEFTA 2006 is considered endogenous and correlated with unobserved unit effect. Applying FEVD it was found that in each WB country imports and exports are below their potential level with the EU. The results suggest that even as BiH moves towards its potential trade levels the trade deficit will remain, albeit at a diminishing level if capacity building for stronger trade policy dialog continues and more opportunities to diversified BiH export are exploit.

¹ This report benefited from the Umbrella Facility for Trade trust fund that is supported by the Governments of the Netherlands, Norway, Sweden, Switzerland and the United Kingdom. Affiliation of the authors: *WBG; **Ministry of Foreign Trade and Economic Relations. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s).

Acknowledgment:

This report benefited from the Umbrella Facility for Trade trust fund that is supported by the Governments of the Netherlands, Norway, Sweden, Switzerland and the United Kingdom.

The authors team would like to thank to the technical staff from the BiH Ministry of Foreign Trade and Economic Relations

The World Bank team would like to compliment and thank the key technical staff from the BH Ministry of Finance and Treasury for participation in the final report presentation for their sincere engagement and frank discussions during presentation. We do hope that the reports of such type will move forward trade policy discussion and open the opportunities for more dialog on this issue in BiH.

The team is grateful to Gallina A. Vincelette (Practice Manager, Macroeconomic, Trade and Investment Global Practice) for all support and guidance, Ian John Douglas Gillson (Lead Economist) for useful advice as well as colleagues Bojan Shimbov, Ekaterina Vostroknutova, Simon Davies and Shawn W. Tan for early comments on the report. In addition, the team would like to thank to local consultants Merima Balavac and Edvard Orlic for their help with the questionnaire preparation and implementation and following World Bank staff for their support with the questionnaire development: Asli Senkal, Cesar A. Cancho, Kiryl Hajduk, Lazar Šestović and Sanja Madžarević-Šujster.

© 2019 International Bank for Reconstruction and Development / The World Bank

1818 H Street NW

Washington DC 20433

Telephone: 202-473-1000

Internet: www.worldbank.org

This work is a product of the staff of The World Bank with external contributions. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of the The World Bank, its Board of Executive Directors or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Copyright Statement:

The material in this publication is copyrighted. Because the World Bank encourages dissemination of its knowledge, this work may be reproduced, in whole or in part, for noncommercial purposes as long as full attribution to this work is given.

All queries on rights and licenses, including subsidiary rights, should be addressed to World Bank Publications, The World Bank Group, 1818 H Street NW, Washington, DC 20433, USA, fax 202-522-2625, e-mail pubrights@worldbank.org.

List of Abbreviations:

AR	Auto regressin
BiH	Bosnia and Herzegovina
CBBIH	Central Bank of Bosnia and Herzegovina
CEFTA 2006	Central European Free Trade Agreement
CEES	Central and Eastern European Countries
CES	Constant Elasticity of Substitution
EC	European Commission
EU	European Union
FEVD	Fixed Effect Vector Decomposition
FEVDA	FEVD Augmented
FTA	Free Trade Area
GDP	Gross Domestic Product
OHR	Office of the Higher Representative
OECD	Organisation for Economic Co-operation and Development
USA	United States of America
SEEC	South East European Countries
UN	United Nations
VAT	Value Added Tax
WB	Western Balkans
WEO	World Economic Outlook

Contents

1 INTRODUCTION	6
2 THEORETICAL AND EMPIRICAL CONSIDERATIONS	7
MULTILATERAL RESISTANCE.....	8
ENDOGENEITY	10
VARIABLE SELECTION	11
3 DATA, MODEL AND ESTIMATION PROCEDURE	12
DATA.....	12
MODEL	15
ESTIMATION PROCEDURE	18
4 TRADE POTENTIAL RESULTS AND CEFTA EFFECT DISCUSSION.....	23
5 CONCLUDING THOUGHTS.....	30
<i>Appendix 1</i>	<i>33</i>
<i>Combined Coefficient for CEFTA 2006 Exports:</i>	<i>33</i>
<i>Appendix 2</i>	<i>34</i>
<i>Do file</i>	<i>34</i>
<i>Literature</i>	<i>38</i>

1 Introduction

For Western Balkan countries, free trade agreements may be an important part of achieving a smoother transition and accession to the EU. Theoretically the introduction of a free trade area can contribute to economic development and improved regional cooperation. The Central Free European Trade Agreement 2006 was signed by Albania, Bosnia and Herzegovina, Croatia, North Macedonia, Moldova, Montenegro and Serbia (including Kosovo as defined by UN Security Council resolution 1244) on December 19, 2006 in Bucharest. Bosnia and Herzegovina's parliament ratified the agreement on September 6, 2007. This delay in the ratification was due to criticisms by the local agricultural lobby. BiH's farmers were worried that CEFTA's 2006 provisions for removing customs duties may further weaken their position in local and regional markets. The Office of the Higher Representative had been insisting that BiH should ratify the agreement (OHR, 2007).

According to the European Commission (2006) the main reason why CEFTA 2006 countries entered into their agreement was the expected real economic benefits for their economies. EU Enlargement Commissioner Olli Rehn regarding CEFTA 2006 said²: "It makes an important contribution to economic development and regional co-operation." In the same statement EU Trade Commissioner Peter Mandelson said: "... The expanded CEFTA 2006 will offer real economic benefits to all sides. But it also sends an important political signal. Closer trade relations in South Eastern Europe are a foundation for stability and growing prosperity."

It can be argued that these statements need supporting evidence. It is reasonable to expect that the EU wants to see CEFTA 2006 countries as integrated economies. Some of these countries are candidates and some are potential candidates for EU membership. The EU is continually working on the development of its economic union, since it has a single monetary system, central bank, as well as working towards the establishment of unified fiscal system and a common foreign economic policy. According to economic integration theory the final stage of an economic union is full integration of the member countries.

² Europa press releases IP/06/1837, 19 December 2006, available at <http://europa.eu>

According to EC decision no. 533/2004, the “EC confirmed its determination fully and effectively to support the European perspective of the WB countries, affirming that WB will become an integral part of the EU once they meet the established criteria”. Hence the EU perceives the Western Balkans as potential members and therefore it is not surprising that EU officials support CEFTA 2006. Since CEFTA 2006 was signed between WB countries it is possible to evaluate only whether it has had an effect in the short run and this is what this paper is investigating. In order to assess whether forming an FTA was a good policy decision for all Western Balkan countries, an ex-post empirical analysis is required. Hence three key areas are developed in this paper. The first is the model set up for calculation of BiH’s trade potential; the second is an estimation of the effects of a new CEFTA using gravity equations; and the third is a discussion of the effects of the new CEFTA on the trade deficit sustainability in BiH. This paper is organised in five sections. After this introduction, section 2 starts with the theoretical and empirical considerations. Data, model and estimation procedure are reported in section 3, followed by results discussion and concluding thoughts in the final section.

2 Theoretical and empirical considerations

Gravity equations have been used increasingly to analyse patterns of international trade (e.g. Frankel et al., 1996; Rose 2000; Glick and Rose 2001; Bun 2006; Baier et al., 2007; Caporale et al., 2008; Stack and Penrtecost 2011). Bun (2006), for example, discusses gravity equations used in empirical applications to international trade back in the 1960s. The standard gravity model is used to explain the volume of trade between countries conditioned on their national income and the distance between them. Hence,

$$T_{ij}=C \frac{Y_i Y_j}{D_{ij}} \quad (1)$$

Applied to economic flows (i.e. bilateral trade) the intensity of trade flows between two countries (T_{ij}), where i and j index countries (and $i \neq j$), is a product of:

- their national incomes (Y_i and Y_j) divided by
- the distance between them (D_{ij})
- with the result multiplied by some constant term C

Taking logs and adding an error (normally distributed) for estimation purposes, trade flows can be estimated as:

$$\ln T_{ij} = c + \ln Y_i + \ln Y_j - D_{ij} + u_{ij} \quad (2)$$

This is the standard “gravity” equation. The anticipated effects of this standard model would be the higher the GDP (for country pairs) the higher the trade flows and the greater the distance between the countries the lower the trade.

Empirical work on trade using gravity models typically uses panel data (Bussière et al., 2005; Bun 2006; Baier et al., 2007; Caporale et al., 2008; Plüemper and Troeger 2011). According to Baltagi (2008), panel data enable controlling for unobserved heterogeneity in either individual country effects or time effects or even both, although the technical nature of the approach to unobserved heterogeneity varies according to whether fixed or random effects estimation is adopted. A fixed effects approach would be appropriate if it is assumed that some or all explanatory variables are correlated with the error term; while a random effects approach would be appropriate if all explanatory variables are assumed not correlated with the error-term (Mundlak, 1978). Hence, some important issues need addressing before commencing an empirical assessment. These considerations cover: techniques that can account for unobservable factors such as multilateral resistance; the treatment of membership of a free trade area (FTA) (whether FTA membership is modelled as endogenous or exogenous), and variable selection based on a theoretical framework. These are now discussed, together with their likely empirical implications.

Multilateral resistance

The term multilateral resistance was introduced by Anderson and van Wincoop (2003). They argue that the gravity literature does not typically include multilateral resistance, or if it is included then it is in the form of an atheoretic variable related to distance. They refer to the persistence of price differentials as indicating multilateral resistance, explaining that prices differ between locations as a result of trade costs (such as

information costs, design costs, various legal costs). Many of these costs are not directly observable, though ignoring price differences can result in omitted variable bias. Since multilateral resistance effects are captured by fixed effects (Baldwin and Taglioni, 2007), the empirical gravity equation no longer suffers from omitted variable bias; hence, consistent estimation is possible. However, with the standard fixed effect method the inclusion of the fixed effects does not allow estimation of the time-invariant variables, like distance. Hence applying a *two-step procedure* is recommended (Bussière et al., 2005; Baldwin and Taglioni, 2007). According to this procedure, in the *first step* the standard fixed effect is estimated, where the country-pair individual effect covers all unobservable factors related to trade resistance. As they are collinear with the country-pair individual effects, the estimation of coefficients on distance and other dummy variables is not possible. Yet, by simply running the *second step* regression, these unobservable factors are filtered out (Cheng and Wall, 2005). In the *second step*, the fixed effects from the *first step* regression are obtained and then they are regressed on all dummy variables except FTA in order to filter out the importance of these variables in the fixed effect. The FTA variable is already introduced in the *first step*, since it was already in existence or expanded during the period analysed, and thus varies during the sample period analysed. Bussière et al. (2005) applied this procedure in order to calculate trade potential of Central and Eastern European countries. Caporale et al. (2008) applied a similar procedure but extended it to three steps. Their procedure is called “the fixed effect vector decomposition technique” initially developed by Plüemper and Troeger (2004). The main difference between the two procedures is obviously the *third step*. Caporale et al. (2008) obtained the residuals from the *second step* and then they repeated the first step regression including the residuals of the *second step*, together with all other explanatory variables and all dummy variables. Plüemper and Troeger (2007) set a code for the fixed effect vector decomposition regression called: “xtfevd” which is available for download and it runs in Stata 11. In this estimation Bussière et al.’s. (2005) approach is applied in order to calculate WB countries’ trade potential but with a slight improvement to their suggested procedure which is showed below in part related to estimation procedure.

To estimate CEFTA 2006 effect on BiH trade flows as preferred technique FEVD (Plüemper and Troeger 2011) will be applied. Some caveats with respect to the FEVD technique are contested in the literature and they concern the different standard errors for some variables. As suggested in Breusch et al. (2010) and Greene (2010), there are often problems with variances in staged estimation unless standard errors are corrected. The main issue that remains with the FEVD technique is the above problem with variances in stage estimation. As Plüemper and Troeger (2011) discussed in their response to Breusch et al. (2010) and Greene (2010) in the current version of `xtfevd` file the problem of too small standard errors is been corrected. In our work the FEVD technique additional contribution is in adopting the AR(1) regression as an option for the preferred estimate. Hence the structure of the residual is used as a part of the estimator. The AR parameter is estimated jointly with the beta coefficients and therefore, both the slope coefficients and the standard errors are adjusted. We found that a Prais-Winsten AR(1) regression should be applied as preferred estimate if the first-order serial correlation in the residuals is detected.

Endogeneity

Another consideration that is important to address is how to treat membership of a FTA, in particular the issue of endogeneity. Since, in the estimation, CEFTA 2006 (Central European Free Trade Agreement) is the variable of interest in the gravity method estimation, an important consideration for empirical estimation is how it is treated, whether the membership is modelled as endogenous or exogenous. Since unobserved determinants of trade are usually correlated with observed explanatory variables, for example due to an omitted policy variable which can be an important determinant of a country's decision to enter into a FTA. In our model CEFTA 2006 is treated as endogenous, since it represents the government's decision to enter.

Bun and Klaassen (2002) explain that endogeneity is usually ignored in the literature, though some empirical studies have addressed this issue (Baier and Bergstrand, 2002; Baier et. al., 2007; Alba et. al 2008; Caporale et al., 2008). However, Caporale et al. argue that there is still no uniformity in the empirical analysis of the effects of a FTA. Studies use different methods in their empirical implementation, so it is not surprising

that their treatment of FTA's is not consistent. More recent studies typically use fixed effects approaches to deal with this issue. A fixed effects approach with time dummies is applied since including the time dummies in fixed effect estimation, according to Baldwin and Taglioni (2007), should eliminate the bias stemming from the omission of the multilateral resistance term.

Variable selection

The appropriate selection of variables for inclusion in the gravity model is mainly dependent on the question of interest. For example, Bun and Klaassen (2002) in order to assess whether trade is a dynamic process include only the core explanatory variables. Since the focus in this paper is to calculate BiH trade potential, four additional explanatory variables are introduced in the model. These additional explanatory variables are: CEFTA 2006 membership; common border; common country (whether in the last twenty-five years countries were a part of common country); difference in unemployment rate and differences in GDP per capita. The inclusion of CEFTA 2006 is important since our main interest is to analyse whether it has had an effect on the trade flows. With the addition of "common border" and "previously part of a common country", the possibility that more trade occurs when these criteria apply is also controlled. The inclusion of the difference in unemployment is to assess whether there is a link between job creation and trade flows since BiH has recently agreed on Reform agenda with significant focus on growth and jobs. With introduction of this variable we will be able to understand better the link between unemployment and trade flow. Finally, the inclusion of the difference in GDP per capita, according to Carillo and Li (2002), if the estimated coefficient is positive then the bigger the difference in per capita GDP the greater the trade. This finding would also suggest a dominance of inter-industry trade. Conversely, if countries with similar per capita income and correspondingly similar tastes, produce similar but differentiated products and trade more among themselves, then this is consistent with the dominance of intra-industry trade.

One more important issue that has to be addressed is that of the dependant variable. For example, in the model of Bussière et al. (2005) the average of exports and imports was

used as the dependent variable, though the reason for this choice was not clearly explained. Baldwin and Taglioni (2007) do provide a discussion of the averaging of the bilateral trade flows. They stress that it is alright to average the two trade flows, as long as the averaging is geometric (sum of the logs) not arithmetic (log of the sums). Yet Baldwin and Taglioni also stress that the theory asserts that the gravity model holds for each and every uni-directional trade flow; since it is a modified CES expenditure function “it explains the value of spending by one nation on the goods produced by another nation” (2007:795). Caporale et al. (2008) take exports as the dependent variable and this has become standard practice in the literature (Fenestra, 2002; Carillo and Li, 2002; Christie’s, 2002; Baire and Bergstand, 2005; Cheng and Wall, 2005; Rault et al., 2008; Caporale et al., 2008). Since the interest is to calculate BiH’s trade potential, the gravity model will be estimated separately for export and imports. Hence, in order to clearly distinguish whether exports and imports were above their potential or under their potential in the observed period of time the gravity model will be estimated separately for exports and for imports. Moreover, it seems to be important to estimate both in order to draw conclusions about future BiH trade deficit sustainability. This issue is extensively discussed in Hlivnjak (2011).

3 Data, model and estimation procedure

In this section data availability for BiH’s trade flows estimation is discussed first, and then the specific gravity model that will be applied is introduced, together with the estimation procedure.

Data

In total there are 242 country pairs in the data sample or 3386 observations in observed time period. The data is available for the period from 2003 to 2016. The dataset includes annual data on export and import flows from all Western Balkan countries to their largest twenty-two trading partners. Trade weights in 2016 and 2018 are presented in Table 1 between BiH and each of its corresponding trade partners. As it can be seen from Table 1, these 22 sample countries share more than 74% of BiH’s imports and more than 83% of

BiH's exports in 2016, while in 2018 they share more than 74% of BiH's imports and more than 84% of BiH's exports.

Table 1: Trade partners share in Western Balkan countries imports and exports

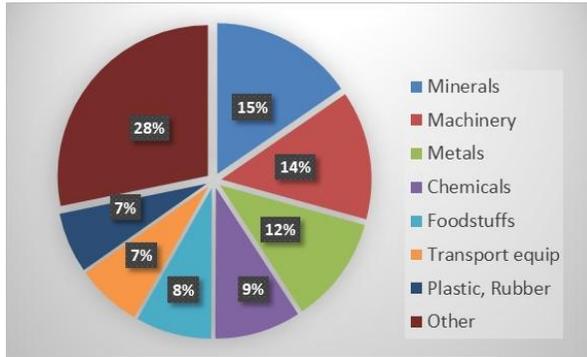
Countries in the model	BiH trade weights 2016		BiH trade weights end 2018	
	exports	imports	exports	imports
Germany	15.7%	12.4%	14.6%	11.9%
Italy	12.0%	11.8%	11.4%	11.3%
Croatia	10.5%	10.0%	12.3%	9.9%
Serbia	8.7%	11.3%	10.5%	10.7%
Slovenia	8.6%	5.1%	8.9%	4.8%
Austria	7.8%	3.4%	8.6%	3.5%
Turkey	4.3%	4.3%	2.7%	4.5%
Romania	1.4%	1.1%	1.6%	1.1%
Hungary	2.1%	2.5%	2.4%	2.6%
Netherlands	2.2%	1.5%	2.2%	1.4%
France	1.7%	2.2%	1.9%	2.1%
Switzerland	1.7%	0.6%	1.7%	0.6%
Macedonia	1.4%	0.9%	1.0%	0.8%
Spain	1.6%	1.1%	0.8%	1.3%
Sweden	0.9%	0.6%	0.8%	0.5%
UK	0.5%	0.9%	0.8%	0.8%
Belgium	0.5%	0.8%	0.5%	0.8%
Bulgaria	1.0%	0.9%	0.4%	0.6%
USA	0.8%	2.0%	0.5%	3.3%
Albania	0.5%	0.0%	0.3%	0.0%
Greece	0.1%	1.1%	0.1%	1.3%
Denmark	0.0%	0.2%	0.0%	0.2%
% of total	83.8%	74.7%	84.1%	74.1%

Note: Data were obtained from the CBBIH, presented figures are the author's own calculations.

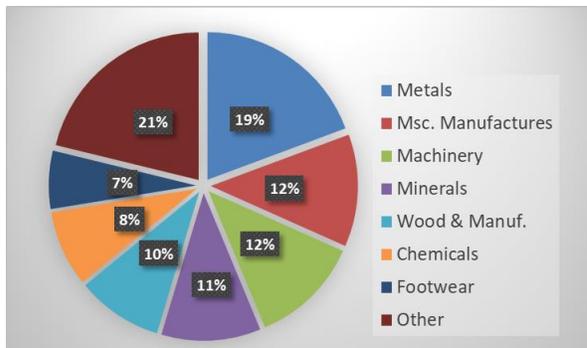
In total it can be seen that trade weight of exports has increased among the countries in the model by 0.3 pp, while trade weight of imports has decreased by 0.7 pp., suggesting reduction of BiH trade deficit in the recent years with its main trading partners. Next two graphs (1 and 2) clearly suggests dominance of re-export in BiH trade. The three main commodity groups which BiH imports it also exports. These are: minerals, machinery and equipment, as well as metals. These three commodity groups describe 41 percent of total imports and 42 percent of total exports. Further analysis suggests that majority of country exports is explained by top 7 commodity groups. These describe in total 79 percent of BiH total exports. Graphs 1 and 2 suggest that export growth was driven by the same three categories as imports, hence strong dominance of re-export commodities. This analysis suggest that our estimation may find that BiH export could be below its potential level, due to low diversification of export commodities. The commodities in which BiH

could have more export potential are chemical commodities and raw wood and wooden products, as these two groups of products are in surplus supply for exports to other markets.

Graph 1: Import contribution, percent



Graph 2: Export contribution, percent



BiH have mainly EU countries as its main trading partners and also ex-Yugoslavian countries (Table 1). Since the EU seems to be an important trading partner for other WB countries, another dummy variable is introduced in the model in order to assess whether being an EU country had an additional effect on WB trade flows.

Total exports are calculated according to the fob parity³ and they are taken from the Central Bank of Bosnia and Herzegovina (CBBiH) database, which is available through its web portal⁴. Export flows to Montenegro and Serbia are only available for each country separately since 2007 and for Kosovo since 2006. This presents a constraint on

³ FOB parity stands for Free on Board, which means that invoice value is decreased for the transportation costs and other costs from the BiH border to the place of delivery abroad if delivery is contracted abroad. If delivery is contracted in BiH then the invoice value is increased by the amount of costs from the place of delivery to the BiH border.

⁴ www.cbbh.ba

the estimation. It is particularly difficult to determine the values of BiH export flows to Serbia and Montenegro, since these two countries declared independence from each other in 2006, but BiH continued to register their trade flows under the joint name: Serbia and Montenegro. Since Serbia's and Montenegro's trade data are not clearly separated we excluded Montenegro. A similar problem is with data availability on trade flows to Kosovo. The data before 2006 were recorded as a part of Serbia's data, and after 2006 they start to be recorded separately. For all these reasons we could not estimate the effect for Montenegro and Kosovo due to lack of data. Data for Moldova were not available hence, it is not included in the sample. With regards to GDP data these are obtained from the World Economic Outlook (WEO) October, 2016 on-line data base. Data on population are also collected from the WEO on-line data base. Distance data are measured in kilometres and obtained from the Michelin recommended road routes between capital cities, except for the USA where the circle distance between capital cities is used (based on latitude and longitude⁵).

Model

Countries in the model are selected based on their overall participation in BiH trade between 2003 and 2016. Albania is included even though it does not belong to the top twenty main trading partners. The reason why it is included is that it belongs to CEFTA 2006 and this need to be taken into account in order to estimate the effect of the new agreement on BiH's trade flows.

With regards to the definition of dummy variables, Bussière et al. (2005) is followed. In the model there are four dummy variables. The *first* dummy variable is for recent membership of a common territory. This includes the countries of the Western Balkans, which within the past twenty-five years all belonged to a common country. More specifically, they include the former Yugoslavian countries (BiH, Croatia, North Macedonia, Serbia, Montenegro and Slovenia). The *second* dummy variable refers to the countries that have a common border. The *third* dummy is BiH VAT. The BiH VAT dummy variable is equal to 1 in 2006 onwards and zero otherwise. This is the year in which VAT was implemented in BiH, hence structural changes could also have had a

⁵ <http://www.chemical-ecology.net/java/lat-long.htm>

significant impact on both exports and imports trade flows. This cannot be assumed to be captured by unobservable factors, since VAT is not time invariant. VAT was introduced at the same time as CEFTA 2006 for BiH, which makes its introduction a potential confounding factor; hence, it needs to be controlled for in the analysis of CEFTA 2006 effects. The fourth dummy variable is for CEFTA 2006 countries. Even though CEFTA 2006 and VAT refer to the same year, the separate CEFTA 2006 and VAT effects can be identified since, although for trade with CEFTA 2006 members the CEFTA 2006 and VAT dummies are the same, for trade with non-CEFTA 2006 members they are not. Hence the CEFTA 2006 dummy variable is equal to 1 if country i and j had concluded a CEFTA agreement in 2006 (onwards) and zero otherwise. According to Bussière et al. (2005), introducing GDP per capita into the equation potentially causes high collinearity between the dummy variables and the population, so they do not include GDP per capita in their estimation. In this model GDP per capita is included but only as the difference between the two countries GDP per capita, which captures the so-called “Linder effect”. The variable for distance is specified in kilometres, as in Bussière et al. (2005) and measures the geographical distance between BiH’s capital Sarajevo and the capital city of each particular trading partner.

The model to analyse BiH’s CEFTA 2006 effect is presented in equation (3). The same model is used later on for calculation of BiH’s trade potential. The model use gravity equations with a country pair fixed effect to model unobservable factors since, these specifications fully utilise the panel dimensions of trade flows between countries. Equation (3) is the main model and all variables are defined in logarithms (previously being collected in millions of USD) except for the dummy variables.

$$T_{ijt} = \alpha_0 + \alpha_1 fbh_{ijt} + \alpha_2 gdppc_{ijt} + \alpha_3 d_{ij} + \alpha_4 CEFTA_{ijt} + \alpha_5 VAT_{ijt} + \alpha_6 Bor_{ij} + \alpha_7 CC_{ij} + u_{ij} + \theta_t + \varepsilon_{ijt} \quad (3)$$

Where:

- T_{ijt} denotes the trade flows (exports or imports) value of bilateral trade between countries i and j at the time t with $i \neq j$. The model is estimated with different dependent variables, hence: exports and imports (of each WB country pair).

- α_0 is the intercept
- fbh_{ijt} represent the sum of nominal GDP of country i and j .
- gdppc_{ijt} represent the GDP per capita difference between country i and j .
- d_{ij} represents the distance between country i and j in kilometres.
- CEFTA_{ijt} is a dummy variable that is equal to 1 if country i and j have concluded a CEFTA agreement by time t (2006 onwards) and zero otherwise.
- VAT_{ijt} is a dummy variable that is equal to 1 only if BH is either country i or j at time t (2006 onwards), and zero otherwise.
- Bor_{ij} is a dummy variable that is equal to 1 if country i and j share a land border.
- CC_{ij} is a common country dummy variable that is equal 1 if country i and j in the last twenty-five years were part of Yugoslavia
- u_{ij} is a country-pair fixed effect
- θ_t is a time specific effect
- ε_{ijt} is the disturbance term

Time specific effects (θ_t) are also included, since some period-specific factors may have an effect on trade flows that are very difficult to identify (Bussière et al., 2005). In addition, writing on panel analysis has emphasised the importance of controlling for period effects to minimise the potential bias of estimates arising from cross-group correlation of the residuals, such as in this case might arise from similar reactions of countries to external shocks (Sarafidis et al., 2006; Roodman, 2009).

Theoretically it is anticipated that the higher the joint GDP the higher the trade flows and the greater the distance between the countries the lower the trade. The expected signs on common country and common border dummy variables and CEFTA 2006 dummy variables are positive, while on the difference in income per capita is generally expected to be positive. As mentioned earlier, the latter is included as an additional regressor in order to proxy the “Linder effect”. In the literature the difference in per capita income is also used to proxy the difference in factor endowments (Bussière et al., 2005; Caproale et al., 2008). Rault et al. (2008) suggest that the Heckscher-Ohlin assumptions are confirmed if the sign on the difference in GDP per capita is positive. In contrast, if the new theory of trade is supported then the expected sign is negative, which suggests the

predominance of intra-industry trade in total trade flows. Their explanation is that countries which are different in factor endowments would exchange more, suggesting that this should involve an increase in trade flows. Next is the estimation procedure and discussion of the results.

Estimation procedure

The estimation procedure can be described through the following steps:

The First step: is based on the estimation⁶ of a standard fixed effect model, hence the main model equation (3) is estimated but without dummy variables. Cheng and Wall (2005) stress that “the country-pair intercept includes the effects of all omitted variables that are cross-sectionally specific but remain constant over time, such as distance” (2005:54). The main reason why dummy variables are excluded is that the country-pair individual effect covers all unobservable factors related to trade resistance. As they are collinear with the country-pair individual effects, estimation of coefficients on distance and other dummy variables is not possible. Hence the following equation (4) is estimated:

$$T_{ijt} = \alpha_0 + \alpha_1 fbh_{ijt} + \alpha_2 gdppc_{ijt} + \alpha_3 CEFTA_{ijt} + \alpha_4 VAT_{ijt} + u_{ij} + \theta_t + \varepsilon_{ijt} \quad (4)$$

In *the second step*: the fixed effects from equation (4) are saved. Then in equation (5) the unit effects (the u_{ij} from 4) are regressed on all time-invariant variables in order to obtain approximate estimates for the time invariant variables. Hence,

$$u_{ij} = \alpha_0 + \alpha_1 d_{ij} + \alpha_2 Bor_{ij} + \alpha_3 CC_{ij} + w_{ij} \quad (5)$$

where:

- α_0 is the intercept

⁶ PPML is an alternative estimator to OLS but since dataset does not suffer from zero trade flows and the PPML may be biased in small samples OLS and FEVD estimation technique were selected. The authors were more worried about potential misspecification of the dynamic linear model in the panel context. Therefore, do file has incorporated CFR to check if something may be missing in specification for e.g. a variable with an autoregressive structure (an AR1 process). Hence, two approaches were applied to estimate the first order dynamic panel model to test the CFRs: OLS, in which the coefficient on the lagged dependent variable is subject to maximum upward bias; and FE estimation, in which the coefficient on the lagged dependent variable is subject to maximum downward bias. In doing so, the model encompasses the whole range of possible dynamic misspecification (see Bond, 2002). By checking the consistency of our tests for the CFRs across both (OLS and FE) the confidence in results can be gained.

- w_{ij} is the residual, i.e. the unobservable, hence unexplained part of the unit effects

In the third step: following Bussière et al. (2005) the residuals from equation (5) are aggregated for country h into a simple “trade condition indicator”, TCI_h where:

$$TCI_h = \frac{1}{2(N-1)} \left[\sum_{i=1}^{N-1} \hat{w}_{ih} + \sum_{j=1}^{N-1} \hat{w}_{hj} \right] \quad (6)$$

- N is the number of countries (any of the WB countries)
- i is the country of origin where $i=1\dots N$
- j is the country of destination where $j=1\dots N$
- \hat{w}_{ih} is the residual from equation (5) between country i and h (i.e. country pair Bosnia and Croatia; Bosnia and Serbia; Bosnia and North Macedonia etc).
- \hat{w}_{hj} is the residual from equation (5) between country h and j (i.e. country pair Croatia and Bosnia; Serbia and Bosnia; North Macedonia and Bosnia etc).

The TCI_h indicator represents the average residual of the second step estimation (w_{ij}), which is actually the part of the fixed effect that is not explained by the time-invariant variables used in the second step estimation. Hence the result is derived from country-pair specific effect after controlling for the levels of the time-invariant variables from step two. According to Bussière et al. (2005) a high fixed effect for the country corresponds to high bilateral trade openness. A high TCI would indicate that this country h has on average strong trade links with the rest of the world, controlling for the core variables. In this case, since exports and imports are observed separately, a positive TCI on exports would indicate that the particular country is exporting above the regions’ average; and negative below. Since the interest is in the WB region, the TCI for each country in WB region will be first calculated. The sample is unbalanced panel. For example, there is data on trade flows between BiH and Croatia and also trade flows from Croatia to BiH; however, although data on trade flows from BiH to Austria is available, what is not available is trade flows from Austria to BiH. Still the residuals (the unexplained part of the fixed effect, u_{it} , from equation (5) correspond to both country pairs from the EU and to country pairs where one country is from the WB region and the

other country is from the EU. Since the trade condition indicator is actually an average country pair specific effect, a positive TCI on imports would indicate that the particular WB country is importing more than the WB region average and a negative that is importing less than the WB region average after controlling for the core variables.

In the fourth step: potential trade is estimated. This estimation according to Bussière et al. (2005) requires re-estimation of equation (4) and then the TCI_h indicator is added from the fitted values of (6). Bussière et al. suggested an alternative way to analyse “normal” trade levels, based on fitted values of the estimated equations. They calculate from the third step (6 in this case) the ratio of the sums of actual and fitted values of trade flows for each Central and Eastern European Country (CEEC) and South Eastern European Country (SEEC), all denoted by m , with twelve-euro area countries (denoted by n), as follows:

$$ratio1_{mt} = \ln \left[\frac{\sum_{n=1}^{12} \exp(T_{mnt})}{\sum_{n=1}^{12} \exp(\hat{T}_{mnt})} \right] \quad (7)$$

where:

T_{mnt} – actual trade flow (e.g. exports) from country m (CEEC or SEEC country) to country n in time t (a subset of twelve euro area countries from the OECD sample)

\hat{T}_{mnt} – estimated trade flow (e.g. exports) from country m (CEEC or SEEC country) to country n in time t (a subset of twelve euro area countries from the OECD sample)

$ratio1_m$ – the sum of all the actual trade flows divided by the sum of all the estimated trade flows for country m .

Regarding estimated T_{mnt} (in the denominator of equation 7) it is interpreted as a trade potential estimator, but based on fitted values of equation (4) and also for all twelve euro area countries. Hence $ratio1_m$ is the sum of all the actual trade flows divided by the sum of all the estimated trade flows for country m . The intuition for this interpretation is developed based on the suggested alternative methodology explained at the end of the

Bussière et al. (2005) paper through the $ratio2_m$ calculation, which is presented in equation 8.

$$ratio2_{mt} = \ln \left[\frac{\sum_{n=1}^{12} \exp(T_{mnt})}{\sum_{n=1}^{12} T_{iit} = \alpha_0 + \alpha_1 Y_{iit} + \alpha_2 YP_{iit} + \alpha_3 d_{ii} + \alpha_4 CEFTA_{iit} + \alpha_5 Bor_{ii} + \alpha_6 CC_{ii} + u_{ii} + \theta_t + \varepsilon_{iit} + tci_n} \right] \quad (8)$$

Where:

1. The numerator is exactly the same as in (7) (i.e., the sum of the actual individual trade flows (e.g. exports) from country m (CEEC or SEEC country) to country n) and
2. the denominator presents estimated trade flows from each euro area country to the other euro area countries plus the term tci_n capturing the average country-pair fixed effect, hence the unobserved influences⁷ that are not explained by the core variables. Here the subscript on tci is “ n ” because it captures the sum of 12 economies’ tci terms.

Bussière et al. did not simplify equation (8); however, it can be written more succinctly as:

$$ratio2_{mt} = \ln \left[\frac{\sum_{n=1}^{12} \exp(T_{mnt})}{\sum_{n=1}^{12} \exp(\hat{T}_{mnt} + tci_n)} \right] \quad (9)$$

Calculations based on (7) suggest that some countries had exceeded their “normal” level of trade with the euro area, like Albania, while other countries like Bosnia and Herzegovina were well below their potential. Bussière et al. argue that this problem might be methodological, since in a transition process some countries quickly improved their performance with the euro area, while some were lagging behind so that their “normal” trade is well below potential trade. In order to calculate a more appropriate trade potential they suggested using (8) or, equivalently (9), with the coefficient estimates from the OECD sample and, as an improvement, to also add the trade condition indicator for each euro area country. All this assumes that in the medium-term each of the WB

⁷ tci_n term is calculated using equation 6

countries will be facing largely comparable conditions: i.e. those of the “*average euro-area trading partners*”. Hence, the logic of economic convergence suggests that there is a problem with the denominator specification in equation (8). In the way equation (8) is written, it seems that Bussière et al. are actually suggesting adding all twelve euro-area trading partners, whereas what they meant was the “*average euro-area trading partners*”. If an attempt is made to calculate the potential trade as suggested in equation (8) then each country in the sample would be far below the EU potential trade, even an EU member country.

If an attempt to calculate the potential trade as suggested in equation (8) then each country in the sample would be well below the EU potential trade.

Hence, by applying (8) or as suggested by Bussière et al.’s (2005) countries trade potential should be calculated as:

$$ratio2_{mt} = \ln \left[\frac{\sum_{n=1}^{12} \exp(T_{mnt})}{\sum_{n=1}^{12} T_{iit} = \alpha_0 + \alpha_1 Y_{iit} + \alpha_2 YP_{iit} + \alpha_3 d_{ii} + \alpha_4 CEFTA_{iit} + \alpha_5 BoT_{ii} + \alpha_6 CC_{ii} + u_{ii} + \theta_r + \varepsilon_{iit} + tci_n} \right] \quad (8)$$

The obtained result based on (8) for both exports and imports would be below the EU12 countries for any of the EU member countries. This is not likely as “normal” trade should be at the “*average euro-area trading partners*”. This is due to the problem with the denominator specification in equation (8). As explained in the text, instead of adding all twelve EU countries in the denominator what needs to be done is to take the EU12 average estimated trade flows and not the sum of EU12 countries estimated trade flows. This is corrected in the modified ratio3_m which is presented in equation (10).

$$ratio3_{mt} = \ln \left[\frac{\sum_{n=1}^{12} \exp(T_{mnt})}{\frac{1}{n} \sum_{n=1}^{12} \exp(\hat{T}_{mnt} + tci_n)} \right] \quad (10)$$

To check our rational, we use the example of Austria. By applying the improved ratio3_m for Austria and comparing it with the results from equation (8), the message is completely different: the (8) suggest that Austria still has substantial potential for raising

its imports and exports with other member states; the latter (10) do not. Given that Austria is a long-standing developed economy member of the EU, and before that had a long-standing high level of integration with the German economy, this is not likely.

Hence, it was decided to follow Bussière et al.'s (2005) suggestion to calculate the second “more realistic trade potential formula” (8), but instead of adding all twelve EU countries estimated trade flows in the denominator it was decided to take their average trade flow through the corrected ratio_{3m} calculation presented in equation 10 above.

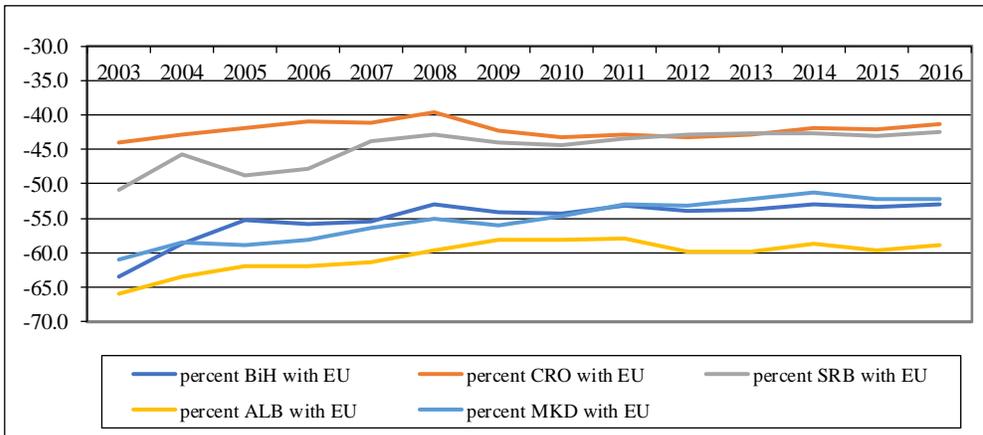
In order to calculate ratio_{3m} the following was performed:

1. Calculate the numerator of equation (8);
2. Estimate equations (4) and (5) in order to calculate the potential trade flows from each EU12 country to the EU12 countries; and for each WB country to WB countries
3. Calculate the trade condition indicator based on equation (6), for each year for which data was available (2003 through 2016).

4 Trade potential results and CEFTA effect discussion

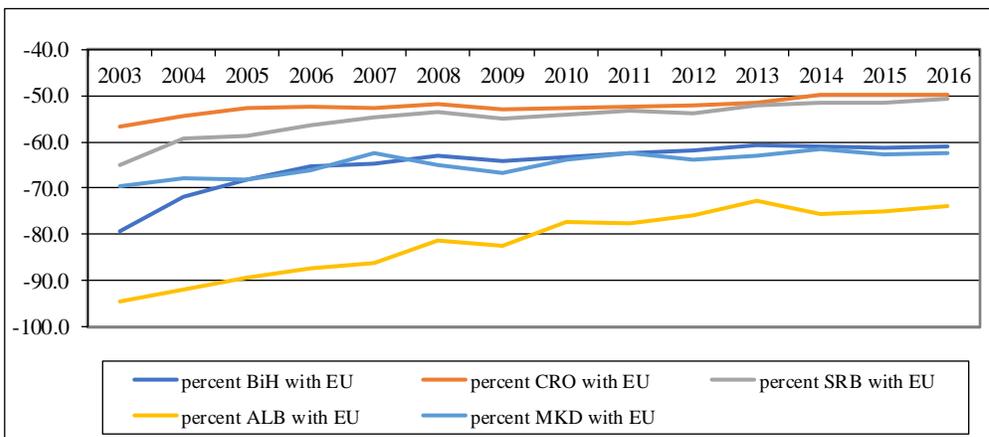
Turning to equation (8) and potential trade calculation the findings for both imports and exports suggest that all WB countries are actually below their potential import and export trade intensity with the EU. The results are presented in Graph 3 for the imports and in the Graph 4 for the exports. These finding do not come as a surprise, since each Western Balkan country does not have the same volume of trade as the EU12 average country. Also, from Tables 1 it is easily detected that other countries outside EU are also participating in WB trade shares (countries like Turkey, Switzerland, USA and CEFTA 2006-member countries).

Graph 3: Ratio of actual imports to potential imports of WB countries with the euro area countries, percent



Based on the above graph of the actual to potential imports ratio, it can be noticed that all WB countries display actual imports typically around 44 to 66 percent below their potential level of imports from the euro area in the observed time period. The results suggest that all WB countries have not yet exhausted possibilities associated with catch-up to their potential level of imports from the euro area. The similar behaviour is apparent in the ratio of actual to potential exports (Graph 4).

Graph 4: Ratio of actual exports to potential exports of WB countries with the euro area countries

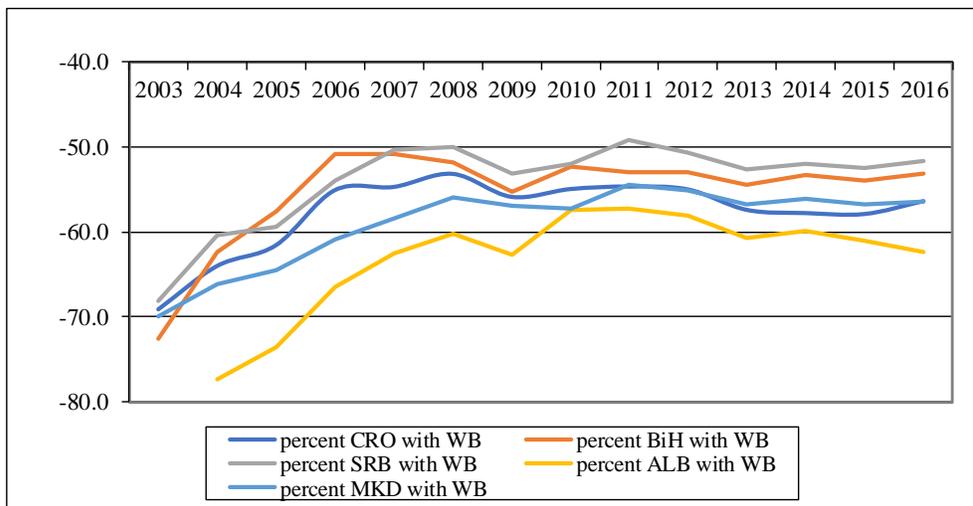


The results on exports potential suggest that during the sample period all WB countries made progress towards their potential level of exports to the euro area. The ratio of actual to potential exports seems to vary among WB countries: i.e. for Croatia and Serbia it is under 51%; for North Macedonia and BiH it is under 62%; while Albania is under 75% of its export potential to the euro area. These calculations suggest that all WB countries

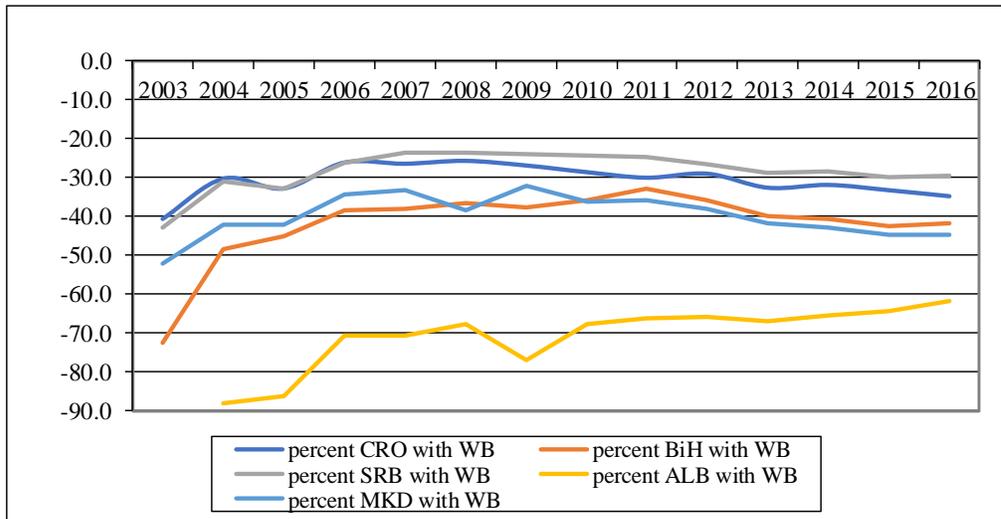
are still below their potential level of exports to the euro area. It is interesting to notice how 2008 “the crisis year” changed the level of exports for each WB country; this finding is evident from the presented graphs and historical trade shares calculation.

Besides calculations of trade potential between WB and EU, the next two graphs present the trade potential within the WB region. Based on the graph 5 of the actual to potential imports ratio, it can be noticed that all WB countries display actual imports typically below their potential level of imports from the region in the observed time period. The results suggest that all WB countries have not yet exhausted possibilities associated with catch-up to their potential level of imports from each other: i.e. BiH and Serbia are below 55%, Croatia and North Macedonia below 58% and Albania even 62 percent. It is interesting to notice how Albania has changed its trade policy since 2014 when it started to slowdown its imports from the WB region but turned more to EU imports. Opposite trend for Albania, as expected, is noticed on the exports trend, but also the opposite behaviour is noticed for all other WB countries when compared to Albania (graphs 5 and 6).

Graph 5: Ratio of actual imports to potential imports of WB countries with the particular WB country



Graph 6: Ratio of actual exports to potential exports of WB countries with the particular WB country



The results on exports potential suggest that during the sample period all WB countries made progress towards their potential level of exports to each other but start slowing down its exports to region since 2014. The ratio of actual to potential exports for the region is between 30 to 42 percent below potential, while Albania is under 60 percent. These calculations suggest that all WB countries are still below their potential level of exports to the region.

Above graphs suggest that country-specific time dummies could be important in explaining export behaviour. This is not surprising since in all the estimations on WB trade flows, country and time dummies are found to be positive and significant. Looking particularly at BiH's actual to potential imports ratio the year 2005 seems to be important. As previously mentioned in the year 2006 VAT was implemented in BiH. According to BH's Indirect Taxation Office (Oma Bulletin number 6, 2006) the announcement of VAT introduction had a positive effect on imports in the year prior to the VAT implementation and, consistent with this claim, it was found that the year dummy for BiH in 2005 in the import equation was positive and significant, hence structural changes could also have had a significant impact on both exports and imports trade flows.

Trade theory predicts that the introduction of a free trade area should contribute to economic development and improved regional cooperation. For WB countries, CEFTA

2006 may also be an important part of achieving a smoother transition and accession to the EU.

According to the estimation results (Table 3), CEFTA 2006 membership increased imports between CEFTA 2006 members by around 48⁸ percent in the observed time period using Fixed Effect Vector Decomposition Augmented model (FEVDA)⁹. This finding is consistent with economic theory that trade agreement increases the volume of trade between the countries.

Table 3: Fixed Effect (FE), Fixed Effect Vector Decomposition (FEVD) and FEVD Augmented (FEVDA) estimation results for CEFTA 2006 model

Description	Variables	FE	FEVD	FEVDA	FE	FEVD	FEVDA
		1	2	3	4	5	6
Income	log(fbh_gdp)	0.66 *** (0.03)	0.67 *** (0.01)	0.40 *** (0.01)	1.50 *** (0.06)	1.50 *** (0.02)	0.67 *** (0.02)
Linder	log(gdppc)	-0.50 *** (0.04)	-0.50 *** (0.01)	-0.46 *** (0.01)	-0.25 *** (0.07)	-0.25 *** (0.01)	0.09 *** (0.02)
Distance	log(distance)	n/a	-0.85 *** (0.01)	-0.71 *** (0.02)	n/a	-1.56 *** (0.02)	-1.10 *** (0.03)
Common country	d_cc	n/a	-0.16 *** (0.02)	-0.02 (0.02)	n/a	0.56 *** (0.03)	1.30 *** (0.04)
Border	d_bor	n/a	0.18 *** (0.00)	0.24 *** (0.01)	n/a	0.09 *** (0.01)	0.30 *** (0.02)
CEFTA	cefta06	0.80 *** (0.05)	-0.24 *** (0.03)	0.39 *** (0.04)	0.33 ** (0.08)	0.02 (0.05)	0.33 *** (0.07)
VAT	vat_bh	-0.01 (0.02)	-0.01 (0.02)	-0.02 (0.02)	0.12 *** (0.03)	0.12 ** (0.04)	0.13 *** (0.03)
Unit effect	unit effect	n/a	1 *** (0.01)	1.02 *** (0.01)	n/a	1 *** (0.01)	1.04 *** (0.02)
BH dummy	d_bh	n/a	0.14 *** (0.03)	-0.25 *** (0.03)	n/a	0.90 *** (0.05)	-0.76 *** (0.05)
Interaction term	d_bhcefta	-0.23 *** (0.04)	0.29 *** (0.03)	-0.07 ** (0.03)	-0.14 ** (0.07)	0.01 (0.03)	-0.24 *** (0.05)
Croatia dummy	d_cro	n/a	0.01 (0.02)	-0.24 *** (0.02)	n/a	0.48 *** (0.03)	-0.64 *** (0.04)
Serbia dummy	d_srb	n/a	0.16 *** (0.02)	-0.12 *** (0.03)	n/a	0.86 *** (0.04)	-0.51 *** (0.04)
Macedonia dummy	d_mace	n/a	0.13 *** (0.03)	-0.31 *** (0.03)	n/a	1.20 *** (0.04)	-0.64 *** (0.05)
Albania dummy	d_alb	n/a	-0.34 *** (0.02)	-0.73 *** (0.03)	n/a	0.28 *** (0.04)	-1.49 *** (0.05)
EU dummy	d_eu	-0.02 (0.01)	-0.02 (0.01)	-0.11 *** (0.01)	0.07 ** (0.02)	0.07 *** (0.02)	0.06 ** (0.02)
constant	_cons	-0.08 (0.15)	2.46 *** (0.06)	3.44 *** (0.07)	-4.27 *** (0.27)	0.12 (0.10)	3.18 *** (0.11)

⁸ (exp(0.39)-1=47.7%)

⁹ See Annex 2 for detailed do.file on the augmented FEVD procedure with suggested improvements.

Note: *** significant at 1%; ** significant at 5%; * significant at 10%; standard errors are in parenthesis.

In order to assess whether Bosnian membership of CEFTA 2006 - modelled by `d_BHCEFTA` (the interaction term for BiH and CEFTA 2006) - had an affect on BiH imports the combined coefficient are computed – i.e., the sum of the CEFTA 2006 dummy and of the BiH-CEFTA interaction - and the corresponding standard errors, t-statistics and p-values. Table 4 reports the findings for BiH.

Table 4: Combined coefficient for BiH CEFTA 2006

FEVDA

```
(lincom) cefta06 + d_bhcefta = 0
```

import	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
(1)	.3173993	.0302762	10.48	0.000	.258036 .3767627

Based on the results from Table 4, it is rejected the null hypothesis that the above two combined coefficients are insignificantly different from zero. According to this results it was found that in the observed time period the formation of CEFTA 2006 had a positive effect on BiH’s imports. CEFTA 2006 membership increased imports from BiH to CEFTA 2006 members by 37%¹⁰ in the observed time period. Looking at the other WB countries estimation results (Appendix 1) it can be concluded that CEFTA 2006 membership also increased the imports from other CEFTA 2006 members. The increase for Croatia was by 12%, Serbia 21% and North Macedonia 27%. Albania was excluded to avoid dummy variable trap.

The same procedure as for imports had to be applied in order to assess whether CEFTA 2006 membership had an effect on BiH exports. The findings are reported in Table 5.

Table 5: Combined coefficient for BiH CEFTA 2006

¹⁰ $(\exp 0.317) - 1 = 37.4\%$

FEVDA

(lincom) cefta06 + d_bhcefta = 0

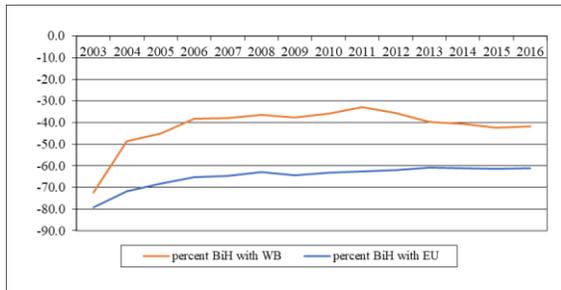
	export	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
(1)		.0888409	.0524769	1.69	0.091	-.0140521 .1917339

Based on the results from Table 5, it is again rejected the null hypothesis that the above two combined coefficients are insignificantly different from zero. According to this result it was found that in the observed time period the formation of CEFTA 2006 had a positive effect on BiH's exports. Hence, CEFTA 2006 membership increased exports from BiH to CEFTA 2006 members by 9%¹¹ in the observed time period. Assessing the other WB countries combined coefficient, the null hypothesis is accepted for Serbia, Croatia and North Macedonia but the sign is positive as expected. CEFTA 2006 membership increased exports from Serbia to CEFTA 2006 members by 9%, for North Macedonia by 18% and Croatia by 30%.

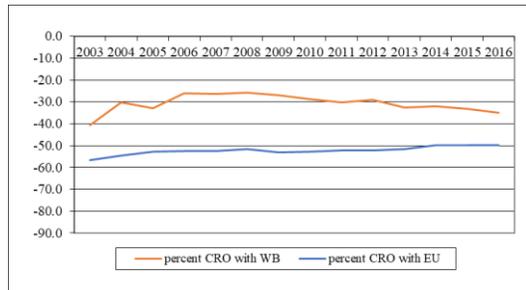
Overall, the results suggest that BiH exporters are exploiting the opportunities of the free trade agreement among WB countries. Still, given what is known about the BiH supply side and its relatively sluggish export and import performance, and based on strong dominance of re-export, FEVD result seems to be sensible i.e., a proportionate response of exports and imports to income. It can be argued that this could be the consequence of the still undeveloped product mix that BiH companies have to offer, as well as weak institutions that do not create opportunities for local business to benefit from freer trade. Next set of graphs (7,8,9,10 and 11) provides comparative presentation of opportunities to exploit export potential between each WB country and with EU.

¹¹ $(\exp(0.0888409)-1)=9.3\%$

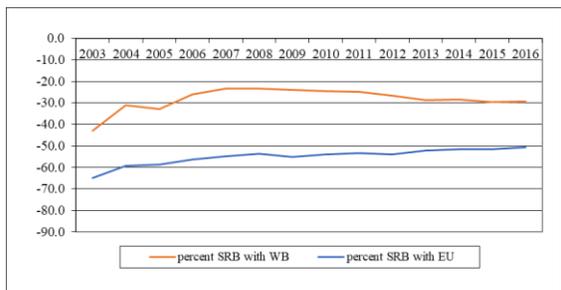
Graph 7: Bosnia and Herzegovina export potential with WB and EU



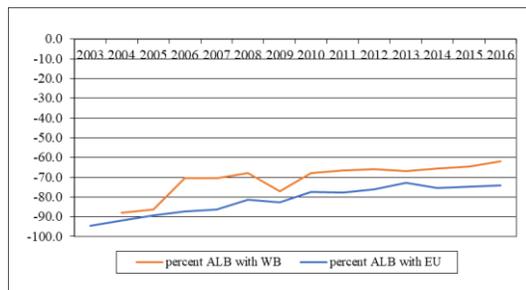
Graph 8: Croatia export potential with WB and EU



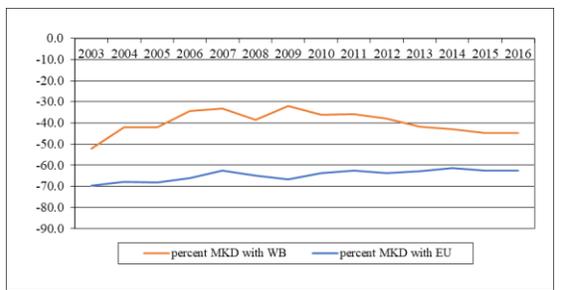
Graph 9: Serbia export potential with WB and EU



Graph 10: Albania export potential with WB and EU



Graph 11: North Macedonia export potential with WB and EU



5 Concluding thoughts

This paper calculates WB countries' trade potential and discusses the effects of CEFTA 2006 on WB trade flows. The estimation based on gravity models suggests that participating in a CEFTA 2006 has had a significant and positive effect on trade flows for

WB imports and WB exports. The model suggests that all WB countries have not yet exhausted possibilities associated with catch-up to their potential level of trade with EU economies nor among themselves. The findings suggest that CEFTA 2006 had increased trade flows among WB countries. The effect of CEFTA 2006 on individual countries found that CEFTA 2006 had a positive and significant effect on countries imports, and significant and positive effect on these countries' exports.

The analysis presented in this paper suggested that CEFTA 2006 could bring member countries closer together and help them towards more integrated trading relations and hence smoothing transition to EU membership. It is reasonable to expect to see CEFTA 2006 countries as becoming integrated economies, not least because all these countries are potential candidates for EU membership, except Croatia which is already a member. The EU is continually working on the development of its economic union, as well as working towards the establishment of unified fiscal system and a common foreign economic policy. According to economic integration theory the final stage of an economic union is full integration of the member countries. Overall consistency is found with the above and this paper findings.

The particular interest was on BiH, and the results suggest that even as BiH moves towards its potential trade levels the trade deficit will remain, albeit at a diminishing level. Most probably this is a result of failure to enact structural and institutional changes in BiH. Without structural changes and with an undeveloped product mix, as well as weak institutions that do not create opportunities for local business to benefit from freer trade, BiH would, according to this analysis, still maintain a trade deficit. To join the CEFTA 2006 seems to be good policy decision for BiH since CEFTA 2006 membership had increased both exports and imports by around 9 and 37 percent with other CEFTA 2006 members in the observed period.

Appendix 1

Albania is excluded to avoid dummy variable trap.

Combined Coefficient for CEFTA 2006 Imports:

Durbin-Watson statistic (original) 0.643428
Durbin-Watson statistic (transformed) 1.736850

Bosnia and Herzegovina:

```
( 1) cefta06 + d_bhcefta = 0
```

import	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
(1)	.3173993	.0302762	10.48	0.000	.258036 .3767627

Croatia:

```
( 1) cefta06 + d_crocefta = 0
```

import	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
(1)	.1174852	.0277578	4.23	0.000	.0630596 .1719108

Serbia:

```
( 1) cefta06 + d_srbcefta = 0
```

import	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
(1)	.1938389	.0287747	6.74	0.000	.1374196 .2502582

North Macedonia:

```
( 1) cefta06 + d_macecefta = 0
```

import	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
(1)	.2418424	.0291139	8.31	0.000	.1847579 .298927

Combined Coefficient for CEFTA 2006 Exports:

Durbin-Watson statistic (original) 0.643289
Durbin-Watson statistic (transformed) 1.904614

Bosnia and Herzegovina:

```
( 1) cefta06 + d_bhcefta = 0
```

export	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
--------	-------	-----------	---	------	----------------------

(1)	.0888409	.0524769	1.69	0.091	-.0140521	.1917339
-----	----------	----------	------	-------	-----------	----------

Croatia:

(1) cefta06 + d_crocefta = 0

export	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
(1)	.2627075	.0481522	5.46	0.000	.1682941 .3571209

Serbia:

(1) cefta06 + d_srbcefta = 0

export	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
(1)	.0856763	.0499647	1.71	0.086	-.0122909 .1836435

North Macedonia:

(1) cefta06 + d_macecefta = 0

export	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
(1)	.161554	.0505226	3.20	0.001	.0624928 .2606152

Appendix 2

Do file

```
tsset code year
```

```
quietly tabulate year, generate(dum)
```

```
xtreg export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh d_bh d_cro d_srb
d_mace d_alb d_bhcefta d_crocefta d_srbcefta d_macecefta d_albcefta d_aust
d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk d_eu dum2-
dum14, fe
```

```
xtreg export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh d_bh d_cro d_srb
d_mace d_alb d_bhcefta d_crocefta d_srbcefta d_macecefta d_albcefta d_aust
d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk d_eu dum2-
dum14, fe vce(robust)
```

stage two, fixed effects obtained from stage one

```
predict Fixed_effects, u
```

```
reg Fixed_effects distance d_cc d_bor d_bh d_cro d_srb d_mace d_alb d_aust
d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk
```

stage three, residuals obtained from stage two

```

predict resid_stage2, residuals
reg export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh resid_stage2 d_bh
d_cro d_srb d_mace d_alb d_bhcefta d_crocefta d_srbcefta d_macecefta d_albcefta
d_aust d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk d_eu
dum2-dum14

lvr2plot
estat hettest
*estat imtest
estat ovtest
estat vif

reg export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh resid_stage2 d_bh
d_cro d_srb d_mace d_alb d_bhcefta d_crocefta d_srbcefta d_macecefta d_albcefta
d_aust d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk d_eu
dum2-dum14, vce(robust)

lincom cefta06+d_bhcefta
lincom cefta06+d_crocefta
lincom cefta06+d_srbcefta
lincom cefta06+d_macecefta
lincom cefta06+d_albcefta

xtserial export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh resid_stage2
d_bh d_cro d_srb d_mace d_alb d_bhcefta d_crocefta d_srbcefta d_macecefta
d_albcefta d_aust d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe
d_uk d_eu dum2-dum14

*Model improvements*
*Testing and accounting for serial correlation*

xtreg export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh d_bh d_cro d_srb
d_mace d_alb d_bhcefta d_crocefta d_srbcefta d_macecefta d_albcefta d_aust
d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk d_eu dum2-
dum14, fe

xtserial export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh d_bh d_cro
d_srb d_mace d_alb d_bhcefta d_crocefta d_srbcefta d_macecefta d_albcefta
d_aust d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk d_eu
dum2-dum14

*testing the lagged model for CFR*

generate float L_export = 1.export
generate float L_fbh_gdp = 1.fbh_gdp
generate float L_gdppc = 1.gdppc

*1)OLS*

xtreg export L_export fbh_gdp L_fbh_gdp gdppc L_gdppc cefta06 vat_bh d_bh
d_bhcefta d_crocefta d_srbcefta d_macecefta d_albcefta d_aust d_belg d_den
d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk d_eu dum2-dum14

testnl _b[L_export]*_b[ fbh_gdp] = -_b[ L_fbh_gdp]
testnl _b[L_export]*_b[ gdppc] = -_b[ L_gdppc]

*2)FE*

xtreg export L_export fbh_gdp L_fbh_gdp gdppc L_gdppc cefta06 vat_bh d_bh
d_bhcefta d_crocefta d_srbcefta d_macecefta d_albcefta d_aust d_belg d_den
d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk d_eu dum2-dum14, fe

```

```

testnl _b[L_export]*_b[ fbh_gdp] = -_b[ L_fbh_gdp]
testnl _b[L_export]*_b[ gdppc] = -_b[ L_gdppc]

*first stage: AR1 correction*

xtregar export fbh_gdp gdppc cefta06 vat_bh d_bh d_bhcefta d_crocefta
d_srbcefta d_macecefta d_albcefta d_aust d_belg d_den d_ger d_gre d_esp d_fra
d_ita d_nld d_slo d_swe d_uk d_eu dum2-dum14,fe rhotype(dw) lbi

*AR1 correction with two steps*

xtregar export fbh_gdp gdppc cefta06 vat_bh d_bh d_bhcefta d_crocefta
d_srbcefta d_macecefta d_albcefta d_aust d_belg d_den d_ger d_gre d_esp d_fra
d_ita d_nld d_slo d_swe d_uk d_eu dum2-dum14,fe rhotype(dw) twostep lbi

*FE from AR1 correction with two steps*

predict FEAR1_correct, u

*second stage*

reg FEAR1_correct distance d_cc d_bor d_bh d_cro d_srb d_mace d_alb d_aust
d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk

predict FEAR1_resid_stage2, residuals

*stage 3*

reg export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh FEAR1_resid_stage2
d_bh d_cro d_srb d_mace d_alb d_bhcefta d_crocefta d_srbcefta d_macecefta
d_albcefta d_aust d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe
d_uk d_eu dum2-dum14

estat hettest
*estat imtest
estat ovtest
estat vif

xtserial export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh
FEAR1_resid_stage2 d_bh d_cro d_srb d_mace d_alb d_bhcefta d_crocefta
d_srbcefta d_macecefta d_albcefta d_aust d_belg d_den d_ger d_gre d_esp d_fra
d_ita d_nld d_slo d_swe d_uk d_eu dum2-dum14

reg export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh FEAR1_resid_stage2
d_bh d_cro d_srb d_mace d_alb d_bhcefta d_crocefta d_srbcefta d_macecefta
d_albcefta d_aust d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe
d_uk d_eu dum2-dum14, robust

*because of evidence of serial correlation, test for CFR in the third stage*

*1a)OLS*

xtreg export L_export fbh_gdp L_fbh_gdp gdppc L_gdppc cefta06 vat_bh
FEAR1_resid_stage2 d_bh d_cro d_srb d_mace d_alb d_bhcefta d_crocefta
d_srbcefta d_macecefta d_albcefta d_aust d_belg d_den d_ger d_gre d_esp d_fra
d_ita d_nld d_slo d_swe d_uk d_eu dum2-dum14

testnl _b[L_export]*_b[ fbh_gdp] = -_b[ L_fbh_gdp]
testnl _b[L_export]*_b[ gdppc] = -_b[ L_gdppc]

*2a)FE*

```

```

xtreg export L_export fbh_gdp L_fbh_gdp gdppc L_gdppc cefta06 vat_bh
FEAR1_resid_stage2 d_bhcefta d_crocefta d_srbcefta d_macecefta d_albcefta
d_aust d_belg d_den d_ger d_gre d_esp d_fra d_ita d_nld d_slo d_swe d_uk d_eu
dum2-dum14, fe

testnl _b[L_export]*_b[ fbh_gdp] = -_b[ L_fbh_gdp]
testnl _b[L_export]*_b[ gdppc] = -_b[ L_gdppc]

*Prais-Winston for the consistency with the OLS*

prais export fbh_gdp gdppc distance d_cc d_bor cefta06 vat_bh
FEAR1_resid_stage2 d_bh d_cro d_srb d_mace d_alb d_bhcefta d_crocefta
d_srbcefta d_macecefta d_albcefta d_aust d_belg d_den d_ger d_gre d_esp d_fra
d_ita d_nld d_slo d_swe d_uk d_eu dum2-dum14, rhotype(regress)

lincom cefta06+d_bhcefta
lincom cefta06+d_crocefta
lincom cefta06+d_srbcefta
lincom cefta06+d_macecefta
lincom cefta06+d_albcefta

log close

```

Literature

- Alba, D. J, H. Jung, and P. Donghyun, 2008. "Effects of Hub-and-Spoke Free Trade Agreements on Trade: Panel Data Analysis," *Asian Development Bank Working Paper Series*, No 127, October 2008.
- Anderson, J. E and E. van Wincoop, 2003. "Gravity with Gravitas: a Solution to the Border Puzzle," *Boston College Working Papers in Economics*, No. 485.
- Baier, L. S and J. Bergstrand, 2002. "On the Economic Determinants of Free Trade Agreements," *Clemson University Working Paper*, No 290, January 2002.
- Baier, L. S and J. Bergstrand, 2005. "Do Free Trade Agreements Actually Increase Members' International Trade," *Federal Reserve Bank of Atlanta Working Paper Series*, No3, February 2005.
- Baier, L. S, J. H Bergstrand, and P. Egger, 2007. "The New Regionalism Causes and Consequences," *Economie Internationale*, No 109, February 2007.
- Baldwin, R. and D. Taglioni, 2007. "Trade Effects of the Euro: A Comparison of Estimators," *Journal of Economic Integration*, 22(4), pp. 780-818, December 2007.
- Baltagi, B. H., 2008. "Econometric Analysis of Panel Data," 4th Edition, Chichester, England: John Wiley & Sons.
- Bond, S. 2002. "Dynamic Panel Models: A Guide to Micro Data Methods and Practice," Institute for Fiscal Studies / Department of Economics, UCL, Centre for Microdata Methods and practice (CEMMAP) *Working Paper*, CWPO9/02.
- Bosnia and Herzegovina Indirect Taxation Office (ITA), 2006. *Oma Bulletin No. 6, Sarajevo, Bosnia and Herzegovina: ITA Publications.*
- Bosnia and Herzegovina Office of the Higher Representative - OHR, 2007. Press release on: "Focus on Europe: Integration or Isolation" September 2007
- Breusch, T., Ward, B. M., Nguyen, H and T. Kompas, 2010. "On the Fixed Effects Vector Decomposition," MPRA Paper, No. 21452, University Library of Munich, Germany.
- Bussiere, M., J. Fidrmuc, and B. Schnatz, 2005. "Trade Integration of Central and Eastern European countries," *ECB Working Paper Series*, No 545, November 2005.
- Bun, M. and F. J. G. M. Klaassen, 2002. "Has the Euro Increased Trade," *SSRN Working Paper*, October 2002.
- Bun, M, 2006. "International Trade and Currency Unions", Universiteit van Amsterdam, April 2006.
- Caporale, G. M., C. Rault, R. Sova, and A. Sova, 2008. "On the Bilateral Trade Effects of Free Trade Agreements Between the EU-15 and the CEEC-4 countries," The Institute for the Study of Labor (IZA) Discussion Paper, No. 3782, October 2008.
- Carrillo, C. and C. A. Li, 2002. "Trade Blocks and the Gravity Model: Evidence from Latin American Countries," *Working Paper*, Department of Economics, University of Essex, UK.
- Cheng, I. and H. J. Wall, 2005. "Controlling for Heterogeneity in Gravity Models of Trade and Integration," *Federal Reserve Bank of St. Louis Review*, 87(1), pp. 49-63, January/February 2005.

- Christie, E. 2002. "Potential Trade in Southeast Europe: a Gravity Model Approach," *The Vienna Institute for International Economic Studies, Working Paper*, No 21.
- CEFTA, 2006. Available at <http://www.cefta.int/>, last accessed 24.01.2014.
- European Council (EC), 2004. Council Regulation on the Establishment of Partnerships in the Framework of the Stabilisation and Association Process, EC No. 533/2004.
- EU, 2006. "EU Welcomes Signing of New Central European Free Trade Agreement," Europa Press Release, IP/06/1837.
- Feenstra, R. C, 2002. "*Advanced International Trade: Theory and Evidence*," Princeton, Princeton University Press.
- Frankel, A. J., E. Stein and W. Shang-Jin, 1996. "Regional Trading Arrangements: Natural or Super Natural," NBER Working Paper Series, No. 5431.
- Glick, R and A. K. Rose, 2001. "Does a Currency Union Affect Trade? The Time Series Evidence," NBER Working Paper Series, No. 8396.
- Greene, W. 2010. "Fixed Effect Vector Decomposition: A Magical Solution to the Problem of Time Invariant Variables in Fixed Effects Models?," available at: http://web-docs.stern.nyu.edu/old_web/economics/docs/workingpapers/2010/Greene_Comment-FixedEffects.pdf, last accessed 26.01.2014.
- Hlivnjak, S., 2011. "*Current Account Sustainability: the case of Bosnia and Herzegovina*," LAP LAMBERT Academic Publishing, June 2011.
- Mundlak, Y. 1978. "On the Pooling of Time Series and Cross Section Data," *Econometrica*, 46(1), pp. 69-85, January 1978.
- Plumer, T and V. E. Troeger, 2004. "The Estimation of Time-invariant Variables in Panel Analysis with Unit Fixed Effects," Available at SSRN: <http://ssrn.com/abstract=565904>
- Plümer, T and V. E Troeger, 2011, "Fixed Effects Vector Decomposition: Reply January 9, 2011." Available at SSRN: <http://ssrn.com/abstract=1737480> or <http://dx.doi.org/10.2139/ssrn.1737480>
- Rault, C., Sova, R. and A. M. Sova, 2008. "Modeling International Trade Flows Between CEEC and OECD Countries," *CESIFO Working Papers Series*, No. 2282, CESIFO Group Munich.
- Roodman, D. 2009. "How to do xtabond2: An introduction to difference and system GMM in Stata," *The Stata Journal*, 9(1) pp.86-136.
- Rose, K. A, 2000. "One Money, One Market: Estimating the Effect of Common Currencies on Trade," Stockholm University, Institute for International Economic Studies, Seminar Paper, No. 678.
- Sarafidis, V., Yamagata, T. and Robertson, R. 2006. "A Test of Cross-Section Dependence for a Linear Dynamic Panel Model with Regressors," Faculty of Economics, University of Cambridge, available at <http://www.econ.cam.ac.uk/faculty/robertson/HCSdtest14Feb06.pdf>
- Stack, M. M and E. J Pentecost, 2011. "Regional integration and trade: A panel cointegration approach to estimating the gravity model," *Journal of International Trade and Economic Development*, 20(1), pp.53-65, January 2011.